Remarks

Claim 1 has been amended to more clearly define the invention herein. The anodizing step of claim 1 now includes the temperature range and current density range of claim 2. Accordingly claim 2 is unnecessary and is canceled. Since claim 2 has been canceled, claim 3 has been amended to refer only to claim 1.

Rejections Under 35 U.S.C. § 103

Amended claim 1 has been rejected as being unpatentable over Korte (US Patent No. 6,309,427) in combination with Gillich (US Patent No. 5,760,981). Claim 5 is rejected under the same combination of references. Claims 3 and 4, and also claims 6 and 7, have been rejected as being unpatentable over Korte (US Patent No. 6,309,427) in combination with Gillich (US Patent No. 5,760,981) and further in view of Askin et al. (US Patent No. 5,616,231) and Komatsubara et al. (US Patent No. 5,181,969). The Examiner is respectfully requested to reconsider these rejections for the following reasons.

Before specifically addressing the disclosures of the references applied by the Examiner, it may be helpful to again summarize the nature of the claimed invention.

Applicants were faced with the problem of coloring certain anodized aluminum sheet metal parts for automotive external applications. These parts had been formed of magnesium containing aluminum alloys which had been developed for their capability to be formed into body panels in shapes having complex curves and sharp corners. When these aluminum parts were anodized by conventional practices, they had a dark gray surface that was unsuitable for coloring. The texture and appearance of any coloring was

different from the same coloring process applied to anodized panels of lower or no magnesium content. The result was a commercially unacceptable product.

A literature search revealed that others had faced the same problem and had been unable to form a clear anodized coating on high magnesium content aluminum alloys. The background of the invention section of this application reports this finding. It is a real problem.

Since the formability of the magnesium containing aluminum alloy enabled unitary body panels to be formed, that could not be formed by other processes, a solution to the anodizing coloring problem was sought. It was found that with certain aqueous sulfuric acid anodizing baths a clear, bright anodized surface could be formed on the magnesium containing aluminum alloys. These bright surfaces can be colored to produce commercially acceptable vehicle body panels. The process included careful control of acid concentration, bath temperature and current density. These limitations are incorporated in the claims presented for continued prosecution. In order to obtain the clear coatings a relatively weak anodizing procedure with low current density is used. Further, it is advantageous to employ a pre-anodizing treatment to lower surface magnesium content as recited in claims 3 and 4 and 6 and 7.

None of the references cited by the Examiner recognize the existence of the problem faced by applicants and addressed by claims 1 and 3-7. No reference contains a disclosure that would help one skilled in the art to solve the problem of discolored anodized coatings on high magnesium content aluminum alloys.

The Korte patent discloses a method of dyeing an anodized aluminum surface using chromium complex dyes of the formulas disclosed. Korte teaches that his

chromium complex dyes can be used with any anodized aluminum surface. Accordingly, at columns 5 and 6, Korte identifies several families of aluminum alloys that can be anodized for dyeing with his complexes. He identifies several electrolyte baths that can be used for anodizing. He proposes anodizing voltages in the range from 5 to 150V. He proposes temperatures from 5 to 80°C and current densities from 0.3 to 5 A/dm^2 (2.8 to 46.5 A/ft^2). A preferred current density identified by Korte is 2 A/dm^2 (18.6 A/ft^2). No specific electrolytic bath compositions were identified by Korte.

According to Korte, his dyeing method could be applied to any aluminum alloy with any magnesium content. The Korte patent treats all aluminum alloys the same as far as anodizing and coloring is concerned. But high content magnesium aluminum alloys do not anodize and color like other aluminum alloys.

Korte does not recognize any problem in the application of his dyeing method to any anodized aluminum surface. Obviously, Korte had not encountered the problems of coloring anodized surfaces of high magnesium content aluminum alloys. The Korte teaching would not direct anyone, faced with preparing high magnesium content aluminum alloys for coloring, to the solution found by the applicants.

The Examiner turns first to Gillich and then to Gillich, Askin et al. and Komatsubara et al. to make up for the deficiencies of the Korte reference in rejecting applicants' claims.

None of the Gillich, Askin et al. and the Komatsubara et al. patents recognize a problem in anodizing Mg containing Al alloys for coloring. They do not identify any methods for anodizing and coloring high magnesium content aluminum alloys. The purpose of the Gillich patent is to produce a reflective surface on an aluminum alloy.

Gillich uses an anodized surface but he does not color it. The Askin et al. patent discloses an electro-brightening process to make the surfaces of aluminum alloys more mirror-like. But the Askin patent certainly does not teach anything about preparing a magnesium containing, aluminum alloy for anodizing and coloring. Askin does not recognize that problem. The Komatsubara et al. patent does not even disclose an anodizing method. It merely points out the already known idea that higher amounts of magnesium present in aluminum allows for better formability of the aluminum. As stated, none of the references relied upon by the Examiner recognize the problem of producing a colorable anodized coating on a high magnesium content aluminum alloy. Nor do they teach a solution for it.

Claim 1 recites a method with specific parameters for anodizing a surface of an aluminum alloy article, containing more than 3 percent by weight in magnesium, for subsequent coloring. Similarly claim 5 recites a method of making a body component for an automotive vehicle from a sheet of an aluminum alloy containing more than 4 percent by weight magnesium. The claim 5 method comprises forming the sheet into a body component, anodizing a surface of the sheet using specific process parameters to form a clear coating of aluminum oxide, and coloring the clear coating of aluminum oxide. These claims are both rejected as unpatentable over Korte in view of Gillich. But the steps of the rejected claims solve a specific problem which is not contemplated by either Korte or Gillich. There is no logical technical basis to extract the specific processes of claims 1 and 5 from Korte or Gillich when neither reference even contemplates the problem that is solved by the rejected claims. Accordingly it is respectfully requested that claims 1 and 5 be reconsidered and that they be allowed.

Dependent claims 3 and 4 recite method steps to be carried out prior to the anodizing step of claim 1. These claims 3 and 4 methods are used to reduce the magnesium content in the surface of the aluminum alloy of claim 1. Dependent claims 6 and 7 have the same relationship to claim 5 as claims 3 and 4 have to claim 1. Claims 6 and 7 recite the same pretreatment methods for reducing magnesium content in an aluminum alloy sheet. Each of these claims stands rejected as unpatentable over the combination of Korte with Gillich and further in view of Askin et al. and Komatsubara et al.

As shown above, none of these references relied upon by the Examiner purport to reduce the surface magnesium content of an aluminum alloy so that it can be anodized and subsequently colored. As stated, none of the references recognize the problem of anodizing and coloring high magnesium content aluminum alloys. None of the references describes a process for anodizing a magnesium containing, aluminum alloy to avoid the coloring problem. And none of the references describes a practice for specifically removing magnesium from the surface of a magnesium containing aluminum alloy so that it can be anodized to a clear coating for coloring. Accordingly it is respectfully requested that rejections of claims 3 and 4, and 6 and 7 be reconsidered, and that each of these claims be allowed.

It appears that the Examiner relies on the selected references because they disclose a wide range of anodizing practices and of aluminum alloy sheet metal treatment practices that seem to include limitations in the present claims 1 and 3-7. Indeed, very broad practices for anodizing are disclosed. Many different acids can be used for the purpose in a wide range of concentrations. Many different temperatures, voltages, and

current densities can be used. Some of these values overlap parameters included in the rejected claims. But where the prior art fails to recognize the problem solved by the rejected claims, there is no direction provided in the prior art for parameters that can be used to solve the unrecognized problem. The Examiner treats the claimed anodizing parameters and magnesium surface removal parameters as merely routine laboratory experimentation to optimize ranges within known practices. But the fact is, there is no prior art direction or known practice for producing a clear anodized coating on high magnesium content aluminum alloys so that they can be colored.

It is respectfully submitted that claims 1 and 3-7 clearly and distinctly define the invention recited therein and are patentable over the prior art. Accordingly, it is requested that these claims be allowed and the case passed to issue.

Respectfully Submitted,

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